Advances in Accounting, incorporating Advances in International Accounting xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Advances in Accounting, incorporating Advances in International Accounting

journal homepage: www.elsevier.com/locate/adiac

Examining the spread of high quality reporting through the corporate network☆

Robert Felix

Merrick School of Business, University of Baltimore, 11 W. Mount Royal Avenue, Baltimore, MD 21201, United States

ARTICLE INFO

Article history:
Received 29 June 2015
Received in revised form 29 December 2015
Accepted 14 January 2016
Available online xxxx

Keywords:
Board interlocks
Firm centrality
Reporting quality
Network
Audit committee

ABSTRACT

This paper explores whether high reporting quality spreads through the network formed by shared directors. Consistent with the notion that positive information is generally less impactful than negative information in affecting behavior, I find that a firm's own reporting quality is not affected by sharing a director with a firm that is considered to have high reporting quality. However, I find that a firm's reporting quality improves when the firm shares a director with a high reporting quality firm and a firm that is highly connected in the network (i.e.: central). The results suggest that high reporting quality needs the endorsement of a high status firm such as a central firm to travel through the network. Furthermore, firms that are susceptible to poor reporting are the most receptive to the high reporting quality signal coming through central firms. Altogether, this study documents that central firms are in a position to initiate positive reporting contagion.

1. Introduction

The corporate boardroom network, formed by two firms sharing a common director, allows a firm to directly learn about the practices of another firm and often imitate those practices (Mizruchi, 1996). Interestingly, aggressive reporting that leads to misstatements is a practice that spreads through the boardroom network. However, misstatements, by their nature, are an extreme case of aggressive reporting. And since "extreme" negative practices generally generate a stronger reaction than "extreme" positive practices (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), it is unknown if high reporting quality is similarly contagious. Thus, this paper investigates whether high reporting quality spreads through the boardroom network. Consistent with the notion that positive practices are less contagious, I hypothesize and find that high reporting quality is not contagious. Furthermore, I find that certain high status firms can enable the spread of high reporting quality through the corporate network. As such, this study sheds light on how good contagion of reporting practices occurs and furthers our understanding of the impact of networks on accounting practices.

Chiu, Teoh, and Tian (2013) find that a firm is more likely to engage in accounting practices that precipitate a future misstatement if it shares a director with a firm that already employs those practices.[1] Misstatements represent an extreme version of aggressive reporting (Dechow, Ge, Larson, & Sloan, 2011), as only a fraction of firms have misstatements. To that end, the rarity of a given negative practice makes it particularly conspicuous, which in turn makes it more informative (Kellermann, 1984). Accordingly, when a focal firm, the one at the center of analysis, receives various accounting signals from its boardroom network, the most aggressive practices will be conspicuous. Thus, as these aggressive practices gain attention, their benefits (Healy & Wahlen, 1999) become increasingly magnified, making aggressive reporting normalized in the view of the focal firm (Gino, Gu, & Zhong, 2009).

Importantly though, high reporting quality may not be contagious in the same manner for a few reasons. First, psychology literature has consistently documented that "extreme" positive information generates a weaker reaction than extreme negative information (Rozin & Royzman, 2001). This is partly rooted in the idea that more attention is given to information that can help avoid a loss rather than information that can enable a gain (Kahneman & Tversky, 1979). Accordingly, this suggests that although high reporting quality is associated with favorable outcomes (e.g.: Francis, LaFond, Olsson, & Schipper, 2005), it might not be impactful in the corporate network.

A related reason high reporting quality may not be contagious in the network has to do with the costs and benefits of implementing such reporting. High reporting quality is associated with higher information quality, which lowers information asymmetry, and thus lowers a firm's economic costs (Lambert, Leuz, & Verrecchia, 2007). Conversely, improving reporting quality requires additional investments in a firm's reporting process (Goh, 2009 p. 550). Naturally, how a

☆ Financial assistance from the University of Baltimore is gratefully acknowledged.
E-mail address: rfelix@ubalt.edu.

[1] Accounting literature refers to aggressive and high reporting quality reporting. Psychology literature more generally refers to negative and positive practices, so in this paper, these terms will be used interchangeably.

http://dx.doi.org/10.1016/j.adiac.2016.01.001
0882-6110/

firm evaluates this cost–benefit trade-off will affect how their willingness to adopt high reporting quality.

Thus, my first research question aims to determine whether high reporting quality spreads in the corporate network. I measure reporting quality using the absolute value of abnormal accruals by employing the Modified Jones Model (Dechow, Sloan, & Sweeney, 1995) with the performance adjustment suggested by Kothari, Leone, and Wasley (2005). Using data from 1998 to 2012, I define high reporting quality firms as those firms ranked in the lowest quintile of the absolute value of abnormal accruals. Moreover, aggressive reporting firms are defined as those observations in the top quintile. This design allows me to isolate the highest quality and most aggressive reporting in the network, to compare how contagiousness of reporting at the "extremes."

The results reveal that being interlocked with a high reporting quality firm has no impact on a firm's own reporting quality the following year, suggesting that high reporting quality does not spread within the corporate network. However, consistent with prior evidence on the contagiousness of aggressive reporting practices (Chiu et al., 2013), I find that firms that share a director with an aggressive reporting firm have lower reporting quality the following year. This result suggests an asymmetry between the contagiousness of high reporting quality and aggressive reporting practices. Indeed, this result indicates that firms are unmoved to change their reporting practices even after receiving a signal of the highest reporting quality from its network.

The fact that high reporting quality does not travel through the corporate network is an important result in light of the finding of "good" reporting contagion in Chiu et al. (2013). Chiu et al. (2013) show that the number of interlocks a firm has with other non-misstatement firms reduces the firm's own likelihood of a future misstatement. However, it is important to note even within the pool of non-misstatements, there would be a wide range of reporting quality (Dechow et al., 2011), and it is unclear, ex-ante, if the reporting quality of all non-misstatement firms would be similarly contagious. Thus, the goal of this paper is to determine whether the highest reporting quality in the network, as measured by accruals, is contagious. Consequently, while observing a non-misstatement affects the likelihood of non-misstatement, the results of this paper suggest that observing the highest reporting in the network, as measured by accruals, has no impact on a firm's own usage of accruals. Accordingly, high reporting quality, as measured in this paper, is not contagious in the same way that non-misstatements are contagious.

Nonetheless, the result is in line with the notion that negative practices are generally more contagious than positive practices (Baumeister et al., 2001). But the question remains whether high reporting quality can spread among firms at all. This leads to my second research question, which examines how high reporting quality can spread. Prior literature documents that status is a key factor in spreading information through a network (Rogers, 2003). This is likely because the practices of high status actors are generally viewed as being more proper, which makes the other actors in the network more inclined to adopt such practices (Bandura, 1986).

A firm's status is a function of its connectivity to other firms in the boardroom network (Podolny, 1994). Thus, more connected, or central, firms can be potentially influential in the transmission of reporting practices. Furthermore, a firm's centrality allows it to process and utilize the vast amount of information it collects from its network (Bell, 2005). Accordingly, the ability to vet information enhances the credibility of information that emanates from a central firm (Lieberman & Asaba, 2006). Thus, central firms are well positioned to assist in the spread of high reporting quality.

I create an aggregate measure of firm centrality based on four social network measures and label firms with the highest aggregated centrality scores as central firms. I find that high reporting quality spreads through a network but only when a central firm is involved. That is, a high reporting quality firm's information is only impactful to the focal firm when that focal firm also has an interlock to a central firm. However, this result does not hold for other potential status measures such as firm size, further emphasizing the role of centrality as a status maker in the network.

Additional tests show that the effect of centrality to spread high reporting quality is most pronounced in focal firms with high growth, less audit committee member experience and higher ex-ante misstatement risk. Altogether, this indicates that firms that are susceptible to poor reporting practices stand to benefit most from the high reporting quality signal that comes via a central firm. My result does not depend on the type of director forming the interlock, suggesting that the focal firm maybe sorting information according to the status of the sending firm, and not necessarily the status of the linking director. Moreover, the firms that improve their reporting as a result of the high reporting quality signal they receive via central firms also incur higher audit fees, but also have lower betas. This indicates that these firms are indeed bearing the additional costs to improve reporting but that they are also experiencing the benefits of higher reporting quality.

These findings are robust to various tests controlling for the possibility that firms self-select into interlocks with central firms. The results are also robust to controlling for alternate firm networks such as links to high reporting quality through industry or auditor.

This study contributes to the literature on the effects of networks on financial reporting. Consistent with prior studies, I document that aggressive reporting practices spread between firms (Chiu et al., 2013). However, high reporting quality, on its own, does not travel through the network. This suggests an asymmetry of how different reporting styles spread. Furthermore, this study suggests that high reporting quality can spread within the corporate network but only in the presence a central firm. Thus a central firm can endorse high reporting quality practices to facilitate their spread (Rogers, 2003). Consequently, the findings highlight central firms as being able to initiate positive reporting contagion through the network (Davis & Greve, 1997).

The remainder of the paper proceeds as follows: Section 2 outlines the motivation, Section 3 discusses the research design, Section 4 presents the empirical results and Section 5 concludes.

2. Motivation

Board interlocks are an important inter-firm communication channel and affect a wide variety of corporate practices such as the adoption of poison pills, and multi-divisional forms as well as the decision to switch stock exchanges (Davis, 1991; Palmer, Jennings, & Zhou, 1993, Rao, Davis, & Ward, 2000). Board interlocks also impact reporting practices. Prior studies have found that stock option expensing, tax shelter adoption and option backdating all spread between firms that are interlocked (Bizjak, Lemmon, & Whitby, 2009; Brown, 2011; Reppenhagen, 2010).

Most related to this study, Chiu et al. (2013) find that aggressive reporting that leads to a misstatement is contagious between interlocked firms. The fact that aggressive accounting practices spread within the corporate network is consistent with the notion that negative practices are generally contagious (Balch & Armstrong, 2010). This contagiousness can be attributed, in part, to the fact that negative events are rare and are thus particularly noticeable (Kellermann, 1984). Accordingly, since only a fraction of the firms report a misstatement, the aggressive reporting that is a precursor to a misstatement would naturally be conspicuous among all the other reporting signals. Once aggressive accounting is noticed, its rewards would be particularly magnified (Balch & Armstrong, 2010; Healy & Wahlen, 1999), which would then enable the adoption of such reporting.

Of course, high reporting quality is associated with its own set of favorable firm outcomes. For instance, firms with high reporting quality tend to have lower costs of debt (Francis et al., 2005) and lower cost of equity (Francis, LaFond, Olsson, & Schipper, 2004) and lower beta. The intuition behind these findings is that higher reporting quality reduces the information asymmetry between the firm and external

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

users, which in turn thus lowers the firm's economic costs (Lambert et al., 2007).

Importantly, although high reporting quality can be beneficial to a firm, it is unclear whether these potential benefits can propel high reporting quality through the network. This is because a consistent finding in the contagion literature is that "positive" information generates a weaker reaction than "negative" information (Ito, Larsen, Smith, & Cacioppo, 1998) and that positive information has minimal impact toward behavioral changes (Rozin & Royzman, 2001). Part of the reason why positive information is not as impactful can be explained by the notion that loss aversion is stronger than potential gains (Kahneman & Tversky, 1979). In the financial reporting setting, this notion indicates that aggressive reporting practices would be appealing because they can help firms avoid potential losses (Healy & Wahlen, 1999). At the same time, the potential benefits of high reporting quality could be diminished in such a setting.

Another reason that could affect the potential contagion of high reporting quality has to do with costs and benefits of such reporting. As mentioned above, high reporting quality can reduce a firm's economic costs. But to enjoy those benefits, a firm would need to commit additional resources into the reporting process (Goh, 2009 p. 550) in order to improve reporting quality. Naturally, how a firm weighs this cost–benefit trade-off will affect how their willingness to adopt high reporting quality.

It is important to note that the purpose of this study differs from the finding of "good" reporting contagion in Chiu et al. (2013). Chiu et al. (2013) document that the number of interlocks a firm has with other non-misstatement firms reduces the firm's own likelihood of a future misstatement. Since Chiu et al. (2013) examined misstatements, non-misstatement served as an appropriate classification for "good" reporting. However, this study is examining the contagiousness of the highest reporting quality in the network, as measured by accruals. This is a key distinction because even among non-misstatement firms, there is a wide range of different reporting quality (Dechow et al., 2011). Thus, the Chiu et al. (2013) result of "good" contagion presumes that the reporting quality of all non-misstatement firms is equally contagious. But, this study attempts to determine whether observing the highest reporting quality in the network has an impact on a firm's reporting.

The discussion above leads to the following hypothesis in the null form:

H1. High reporting quality does not spread between interlocked firms.

If it is true that high reporting quality does not spread through the corporate network, then the question becomes how this signal could travel through the network. Within a network, high status actors are influential in spreading information (Rogers, 2003). Firms accrue status by virtue of their connectivity, or centrality, within the network (Greve, 2005; Podolny, 1994). Because of their network location, central firms are able to collect a vast amount of information from their network. Furthermore, central firms can parse through that data to find beneficial information for their operations (Bell, 2005; Larcker, So, & Wang, 2013). This in turn enhances the credibility of the information that emanates from a central firm (Lieberman & Asaba, 2006). Additionally, directors at central firms tend to have many directorships, which would make them reticent to spread aggressive reporting practices as such an action could damage their reputation (Bruynseels & Cardinaels, 2013). Altogether, this indicates that central firms possess the status, the information and incentive to spread high reporting quality through the network.[2]

[2] Although central firms could be influential in spreading good reporting, they may be less effective in spreading poor reporting. For instance, Davis and Greve (1997) show that firm centrality is not associated with spread poison pills to the corporate network. However, in Section 4.1, I examine the possibility that central firms spread aggressive reporting quality to the focal firms.

This leads to the following:

H2. High reporting quality spreads among interlocked firms but only through a central firm.

3. Research design

3.1. Empirical model

The purpose of this study is to examine if high reporting quality spreads among firms and whether firm centrality has a moderating effect on this potential contagion. The following model shows the empirical strategy to inspect these issues:

$$\begin{aligned} RQ_{i,t+1} = {} & \beta_0 + \beta_1 \text{High RQ Interlock}_{i,t} + \beta_2 \text{Low RQ Interlock}_{i,t} \\ & + \beta_3 \text{ CF Interock}_{i,t} + \beta_4 \text{CF Interock}_{i,t} * \text{High RQ Interlock}_{i,t} \\ & + \beta_5 \text{ Controls}_{i,t} + \varepsilon. \end{aligned} \quad (1)$$

RQ is the absolute value of abnormal accruals calculated using the modified Jones Model (Dechow et al., 1995) with the performance adjustment as suggested by Kothari et al. (2005). RQ is measured as the absolute value of the residual obtained from regressing accruals on the following: change in revenue less accounts receivable, property plant and equipment and return on assets. The regression is run for each industry-year. Abnormal accruals are a common proxy for reporting quality since higher levels of abnormal accruals are associated with greater incidences of misstatements and material weaknesses (Ashbaugh-Skaife, Collins, Kinney, & LaFond, 2009) while lower levels of accruals are associated with lower economic costs (Dechow et al., 2011).

Moreover, in this setting, abnormal accruals provide a focal firm with steady signal of the accounting practices of the other firms. Additionally, RQ is measured in year $t + 1$ while all regressors are measured in year t. The separation of the independent and dependent variables allows me to determine how a firm responds to accounting signals it receives from its network.

In order to distinguish the various levels of reporting quality, sample firms are sorted into quintiles based on current year RQ. Since abnormal accruals are decreasing in reporting quality, firms in the lowest quintile are labeled "High RQ" firms. High RQ Interlock is coded 1 if a focal firm is interlocked, or shares a director, with a High RQ firm, and 0 otherwise. Accordingly, High RQ Interlock focuses on links to firms with the highest reporting quality and examines whether an interlock with a High RQ firm positively affects the focal firm's reporting the following year. Thus, if being interlocked with a High RQ firm improves a firm's reporting β_1 would be negative. Of course, if H1 is correct in stating that high reporting quality does not travel in the network, then β_1 would be statistically insignificant.

Low RQ Interlock is a binary variable coded 1 if a focal firm is interlocked with a Low RQ firm, where Low RQ firms are those observations in the top quintile of RQ. Low RQ Interlock controls for the contagiousness of aggressive reporting (Chiu et al., 2013). It is important to note that by focusing on the extremes of reporting quality signals, I allow aggressive reporting and high reporting quality to both be conspicuous among the other reporting signals. Thus, Low RQ Interlock and High RQ Interlock focus on the accounting signals at the two "extremes" to examine if these signals similarly spread.

CF Interlock is coded 1 if the focal firm is interlocked with a central firm. Central firms are the most connected firms in the board network and Section 3.2 specifically discusses the calculations of firm centrality. Accordingly, the interaction of CF Interlock and High RQ Interlock indicates the relative impact of central firms on the contagion of high reporting quality. If H2 is correct and central firms have a moderating effect on the spread high reporting quality, then β_4 should be negative. Of course, if central firms do not have an impact on the spread of high reporting quality, then β_4 would be statistically insignificant.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

I control for firm size (Log Assets) and performance (CFO) because prior literature has shown that these characteristics affect reporting quality (Dechow et al., 1995). I include the market to book ratio (MktToBook) in the regression since high growth firms have greater incentives to manage earnings (Skinner & Sloan, 2002). I control for Leverage to proxy for creditor monitoring efforts. In addition, I control the percentage of outside directors on the board (Percent Outsiders) because it is associated with better reporting quality (Klein, 2002).

Moreover, I control Board Size and Total Board Links, which is defined as number of interlocks a firm has with other firms through shared directors. These two variables represent a firm's potential and actual connections to other firms, and thus these variables control for the focal firm's ability to retrieve reporting quality information from its network. Lastly, High RQ is included the in the regression to control a firm's own reporting quality level. Further detail regarding these variables is provided in the Appendix. Industry and year fixed effects are included in each regression and standard errors are clustered by firm.

3.2. Centrality measures

Centrality is measured by four common social network measures. Degree is the sum of direct links a firm has to other firms. For example, if firm A is linked to 4 other firms via its directors, it would have a degree of four. Closeness, which accounts for direct and indirect links a firm may have, measures how quickly one firm can reach other firms. It is defined as the inverse of the average distance between one firm and another. For example, suppose firm A is directly tied to firm B and firm B is directly tied to firm C. Then it takes firm A (C) one step to get to firm B and two steps to get to firm C (A), so on average, it takes 1.5 steps to get to another node, making its closeness 2/3. Firm B, on the other hand, gets to firms A and C in one step so its closeness would be 1. Accordingly, a firm with a higher closeness score is deemed more central.

Betweenness, which measures how often a firm is the intermediary between two other firms, captures the ability of a firm to be an information broker. Stated differently, a firm is more central if it lies on the path of the shortest distance between two other firms. In the above example with firms A, B and C, only firm B is an intermediary. It connects firms A and C so firm B would have a higher betweenness score. Eigenvector centrality captures the quality of a firm's links because being linked to other well connected firms enhances the centrality of the firm. All the centrality measures are normalized by the size of the network, which mitigates the concern that larger firms tend to be more central. The Appendix shows the formal computations for each of these variables.

Using director information obtained from ISS for the period 1996–2012, I map the corporate network of directors for each year separately. Two firms sharing a common director are interlocked. Using board interlocks, I calculate the four centrality measures for each firm-year (Borgoatti, Everett, & Freeman, 2002). Then for each year, I sort each centrality measure by quintile and average the four quintile rankings for each firm-year. Central firm is a binary variable coded 1 if a firm is in the top quintile of the summed quintile rankings for a given year.

3.3. Descriptive statistics

After merging ISS data with COMPUSTAT, my initial sample consists of 22,364 firm-years (Table 1 panel A descriptive statistics). The average sample firm has CFO of .11 and a MktToBook ratio of 2.86. In addition, 69% of a sample firm's board's membership consists of independent directors. Turning to reporting quality, RQ has a mean of .06, and as would be expected, the average firm is in the third quintile of RQ. In addition, High RQ Interlock has a mean of 44%, Low RQ Interlock has a mean of 38% while 54% of sample firms have at least one interlock with a central firm.

Panel B presents the correlation of the main variables. High RQ Interlock is negatively correlated with future RQ, providing some initial evidence that high reporting quality is contagious. CF Interlock is also negatively correlated with RQ, which also suggests that central firms may have an incremental role in the spread of high reporting quality. Low RQ Interlock is positively correlated with RQ but the correlation lacks statistical significance. In Section 4, these relationships are further explored in the multivariate context.

4. Analysis

4.1. Main analysis

Table 2 presents the results of the main empirical model. Column 1 shows the regression of future RQ on High RQ Interlock and the control variables. High RQ Interlock is statistically insignificant. Consistent with H1, this suggests that high reporting quality does not spread between firms in the corporate network. However, Low RQ Interlock is positively significant at the 1% level, which is consistent with the findings of Chiu

Table 1
Descriptive statistics.

Panel A: Univariate statistics

Variable	Mean	P25	P50	P75
RQ_{t+1}	0.057	0.018	0.040	0.076
Rank RQ	3.000	2.000	3.000	4.000
High RQ Interlock	0.436	0.000	0.000	1.000
Low RQ Interlock	0.383	0.000	0.000	1.000
CF Interlock	0.549	0.000	1.000	1.000
Log Assets	7.703	6.494	7.546	8.784
CFO	0.106	0.050	0.098	0.155
MktToBook	2.885	1.403	2.124	3.379
Leverage	0.229	0.065	0.214	0.346
Board Size	9.315	7.000	9.000	11.000
Percent Outsiders	0.688	0.583	0.722	0.833
Total Board Links	5.407	1.000	4.000	7.000

Panel B: Correlations of main variables

	RQ_{t+1}	Log Assets	High RQ Interlock	Low RQ Interlock
Log Assets	−0.193***			
High RQ Interlock	−0.053***	0.310***		
Low RQ Interlock	0.009	0.218***	0.243***	
CF Interlock	−0.062***	0.384***	0.460***	0.366***

This table presents descriptive statistics. Panel A shows the univariate statistics and Panel B provides the correlation of selected variables. All other variables are defined in Appendix A. *, **, and *** indicates that the difference is statistically significant at the 10%, 5% and 1% levels, respectively.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

Table 2
High reporting quality contagion.

Variables	RQ_{t+1}	RQ_{t+1}	RQ_{t+1}
CF Interlock * High RQ Interlock		−0.008***	−0.008***
		(−3.763)	(−3.727)
CF Interlock * Low RQ Interlock			−0.001
			(−0.484)
CF Interlock		0.004***	0.005***
		(3.070)	(3.051)
High RQ Interlock	0.001	0.006***	0.006***
	(0.717)	(3.273)	(3.262)
Low RQ Interlock	0.002**	0.002**	0.003
	(2.070)	(2.163)	(1.556)
Log Assets	−0.006***	−0.006***	−0.005***
	(−13.036)	(−12.744)	(−12.695)
MktToBook	0.001***	0.001***	0.001***
	(6.078)	(6.086)	(6.083)
CFO	0.016**	0.016**	0.016**
	(2.272)	(2.277)	(2.282)
Leverage	−0.006*	−0.006*	−0.006*
	(−1.822)	(−1.938)	(−1.943)
Board Size	0.000	0.000	0.000
	(0.185)	(0.064)	(0.068)
Percent Outsiders	0.001	0.001	0.001
	(0.192)	(0.283)	(0.293)
Total Board Links	0.000	−0.001	−0.001
	(0.362)	(−0.576)	(−0.628)
High RQ	−0.008***	−0.008***	−0.008***
	(−9.309)	(−9.239)	(−9.232)
Industry and year fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	0.103***	0.102***	0.102***
	(9.451)	(9.331)	(9.316)
Observations	18,017	18,017	18,017
R-squared	0.102	0.103	0.103

This table presents results of Model (1). RQ is the absolute value of abnormal accruals calculated as described in the text. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

et al. (2013). Accordingly, even though the two interlock variables focus on the two reporting extremes that could potentially provide conspicuous reporting signals, only the aggressive reporting signal is contagious in the network.

This finding is noteworthy in light of the finding of "good" contagion found in Chiu et al. (2013). While Chiu et al. (2013) measure "good" reporting by non-misstatement firms, good reporting in this paper is identified as firms with the lowest levels of abnormal accruals. This is a key distinction because there is a wide range of different reporting quality even among non-misstatement firms (Dechow et al., 2011). Thus, while observing that a non-misstatement can impact the likelihood of a non-misstatement, observing a high reporting quality, as measured by accruals, does not impact a firm's usage of accruals. Accordingly, the finding in Table 2 reveals that high reporting quality is not contagious in the same way that non-misstatements are contagious.

However, H2 raises the prospects that high status firms may be better positioned to propel high reporting quality through the network. To that end, column 2 shows that the interaction of CF Interlock and High RQ Interlock is significantly negative at the 1% level. Consistent with H2, this suggests that central firms enable high reporting quality to spread within the corporate network. This is likely due to the status and the known informational advantage of central firms. Central firms are widely viewed as high status firms (Davis, 1991; Rogers, 2003) while information that emanates from central firms is deemed to be more credible (Lieberman & Asaba, 2006). Altogether, central firms are well positioned to endorse high reporting quality practices, which aid the adoption decisions of the focal firm.

In column 3, I rerun Model (1) but include an interaction term between Low RQ Interlock and CF Interlock to control for the possibility that central firms also pass along aggressive reporting through the network as well. However, this interaction term is statistically insignificant while the interaction of CF Interlock and High RQ Interlock continues to be significantly negative. This suggests that central firms only facilitate the spread of high reporting quality but not the aggressive reporting. This is consistent with the notion that high status actors are generally not able to influence the spread of negative practices (Davis & Greve, 1997).

High RQ is negative across all three models. This means that firms with the highest reporting quality this year tend to have higher reporting quality the following year as well, which suggests that there is consistency in a firm's reporting quality across years. Thus, although firms tend to have similar reporting quality from year to year on their own, the results of Table 2 imply that firms can improve their reporting quality when interlocked with a central firm. The effects of control variables on reporting quality are consistent with the effects shown in prior literature The R^2 is 10.2% in column 1 and 10.3% for columns two and three, respectively.

The results in Table 2 are robust in several sensitivity tests. First, because central firms tend to have more interlocks with other central firms, the result in Table 2 could merely reflect that similar firms interlock and move in the same direction. To control for this possibility, the analysis of Table 2 is rerun but focal firms that are identified as central firms are dropped from the analysis. The unreported results are unchanged. Second, since centrality tends to be sticky over time, I rerun Table 2 and cluster the standard errors by firm and year. Again, the unreported results are unchanged.

Overall, the results of Table 2 suggest an asymmetry in the spread of aggressive and high reporting quality financial reporting. That is, aggressive reporting is contagious but high reporting quality on its own is not. However, high reporting quality spreads within the corporate network but only through central firms. Thus, central firms are able to initiate positive reporting contagion in the corporate network.

4.2. Cross sectional analysis

The results of Table 2 indicate that only central firms have an effect on the spread of high reporting quality. In this section, I examine whether all focal firms are equally receptive to high reporting quality signals. To examine this issue, I inspect whether specific conditions make firms more receptive to the high reporting quality signal received through central firms. Accordingly, I examine three cross-sectional variables that are associated with low reporting quality. The idea is to test whether firms pre-disposed to low reporting quality benefit most from high reporting quality signals coming from the network.

First, I examine firm growth because prior literature documents that higher growth is associated with higher levels of abnormal accruals (Skinner & Sloan, 2002). The idea is that the growth rate of a firm may contribute to accrual estimation errors (Dechow & Dichev, 2002). Growth is measured as the market to book ratio. Second, I examine audit committee experience. The audit committee is in charge of the reporting process (Klein, 2002) and their experience can impact the reporting of a firm. I measure audit committee experience as the average number of board seats per audit committee member since directors can gain valuable experience about the reporting process from their other board seats (Vafeas, 2005). The third cross sectional variable is F-score, which is the probability that a firm has a material misstatement based on its observable firm characteristics. I follow Dechow et al. (2011) to calculate F-score and note that higher values indicate a higher probability of having a material misstatement. Altogether, these cross-sectional variables represent different firm features that impact reporting quality.

For each cross sectional variable, I rank the sample at the median. Then, I rerun Model (1) but split the sample into firms above and

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

below the median of the cross sectional variable in question. Accordingly, this test aims to seek which firms are most receptive to the high reporting quality signal of central firms. Table 3 presents the results. The interaction of CF Interlock and High RQ Interlock is significantly negative in the following situations: high levels of growth, low levels of audit committee experience and high levels of F-score. This indicates that focal firms that are most likely to have poor reporting quality, ex-ante, are the ones that benefit most from the high reporting quality signal coming from the central firm. Accordingly, while Table 2 shows that central firm spreads high reporting quality through the board network, Table 3 reveals that this effect is concentrated among firms that can benefit the most from the high reporting quality signal.

4.3. Influence test

Thus far, the results reveal that a focal firm's future reporting quality is affected by the high reporting quality signal it receives through the network and that certain focal firm conditions make this effect more likely. Still, it would be instructive to know whether the focal firm is changing its future reporting quality in response to its network's current reporting quality. Such an analysis would illustrate the influence central firms have in spreading high reporting quality, and also shed light on time line of such influence.

To test whether focal firms change their reporting based on reporting signals they receive through central firms, I adopt the "influence" test developed in Bouwman (2011). Specifically, I quintile rank RQ for all sample firms, and then calculate Change RQ as the change in RQ quintile between year t and year t + 1. Then, I calculate the average RQ quintile for each sample firm's interlocking firms (RQ Interlocks). RQ Gap is then computed as the difference between RQ Quintile and RQ Interlocks. RQ Gap compares a firm's reporting quality to the average reporting quality of that firm's interlocking firms. Thus, if RQ Gap is positive (negative), it indicates that the focal firm has worse (better) reporting quality than the average reporting quality of its network firms. Finally, I interact RQ Gap and CF Interlock.

Change RQ is regressed on RQ Gap, CF Interlock the interaction of these two variables and the same set of controls. The interaction is the variable of interest. To that end, if the focal firm has more aggressive reporting quality than its interlocking firms (RQ Gap > 0), then the presence of a central firm among the interlocks could facilitate the endorsement of the high reporting quality signal, which would lead the focal firm to initiate changes in its own reporting quality. Table 4 shows the results of this regression. The interaction of RQ Gap and CF Interlock is negatively significant at the 1% level.

This indicates that if the average reporting quality of a focal firm's interlocking firms is better than the reporting quality of the focal firm in the current year, then the central firm validates the higher reporting quality to the focal firm and in turn, the focal firm responds by improving its reporting quality the following year. This provides more evidence on the role that central firms have in initiating positive reporting quality contagion within the boardroom network. Accordingly, this finding suggests a timeline for this contagion. Specifically, as firms evaluate their current year reporting quality against the reporting quality signals they receive through their network, they respond by changing their reporting quality to approximate the quality of their network.

Table 3
Cross sectional tests.

Dependent variable: RQ_{t+1}						
Variables	Low Growth	High Growth	Low AC Exp.	High AC Exp.	Low F-score	High F-score
CF Interlock * High RQ Interlock	−0.003	−0.012***	−0.011***	−0.004	−0.004	−0.011***
	(−1.029)	(−3.969)	(−3.463)	(−1.195)	(−1.215)	(−3.428)
CF Interlock	0.002	0.005***	0.005**	0.004*	0.001	0.007***
	(0.861)	(2.661)	(2.358)	(1.704)	(0.449)	(2.801)
High RQ Interlock	0.003	0.008***	0.009***	0.003	0.003	0.008***
	(1.142)	(3.233)	(3.173)	(1.151)	(1.038)	(2.803)
Low RQ Interlock	0.002*	0.001	0.004**	0.001	−0.001	0.004**
	(1.860)	(1.050)	(2.231)	(1.139)	(−0.334)	(2.493)
Log Assets	−0.005***	−0.005***	−0.004***	−0.006***	−0.004***	−0.004***
	(−8.362)	(−7.999)	(−6.067)	(−10.148)	(−6.201)	(−4.861)
MktToBook	−0.006***	0.002***	0.002***	0.001***	0.001***	0.001***
	(−6.966)	(7.861)	(4.866)	(3.000)	(3.768)	(4.122)
CFO	0.008	0.007	0.010	0.030***	0.005	0.011
	(0.725)	(0.731)	(1.064)	(2.787)	(0.462)	(1.014)
Leverage	−0.009**	−0.022***	−0.008	−0.005	−0.012**	−0.009*
	(−2.035)	(−4.977)	(−1.597)	(−1.137)	(−2.272)	(−1.709)
Board Size	0.003	−0.002	−0.001	0.002	−0.002	0.001
	(1.459)	(−0.773)	(−0.423)	(1.000)	(−0.789)	(0.523)
Percent Outsiders	−0.002	0.005	0.002	0.000	0.001	0.005
	(−0.620)	(1.266)	(0.568)	(0.008)	(0.204)	(0.981)
Total Board Link	−0.000	−0.001	−0.002*	−0.000	0.001	−0.004***
	(−0.223)	(−0.748)	(−1.782)	(−0.146)	(0.787)	(−2.790)
High RQ	−0.006***	−0.010***	−0.008***	−0.007***	−0.007***	−0.010***
	(−5.318)	(−7.131)	(−6.018)	(−5.266)	(−4.590)	(−6.191)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.092***	0.107***	0.099***	0.072***	0.096***	0.104***
	(8.189)	(7.322)	(6.296)	(6.425)	(5.620)	(6.593)
Observations	8468	9549	7877	7926	6564	6689
R-squared	0.118	0.109	0.107	0.106	0.102	0.093

This table presents cross sectional results based on Model (1). The sample is split at the median of each cross sectional variable and then Model (1) is run once for the subsample above the median and once for the subsample below the median. The cross sectional variables are Growth, AC Experience, and F-score. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. Growth is the percentage change in sales between the prior and the current year. AC Experience is the average number of directorships per audit committee member. F-score is calculated following Dechow et al. (2011) and assigns a probability of financial reporting fraud to a firm based on its observable characteristics. The dependent variable is RQ, the absolute value of abnormal accruals calculated as described in the text. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

Table 4
Influence test.

Variables	Δ RQ Rank
CF Interlock * RQ Diff	−0.121***
	(−8.957)
CF Interlock	0.161***
	(4.851)
RQ Diff	−0.311***
	(−29.367)
Log Assets	−0.074***
	(−7.080)
MktToBook	0.010**
	(2.391)
CFO	0.043
	(0.282)
Leverage	−0.123
	(−1.510)
Board Size	0.023
	(0.519)
Percent Outsiders	−0.014
	(−0.176)
Total Board Link	−0.009
	(−0.363)
High RQ	1.183***
	(34.898)
Industry fixed effects	−0.326***
Year fixed effects	(−4.705)
	0.662*
Constant	(1.848)
Observations	15,506
R-squared	0.25

In this table, the dependent variable is change in RQ Rank, measured as the change in quintile rank of a firm's reporting quality (RQ) between the current year and the following year. RQ is the absolute value of abnormal accruals calculated as described in the text. RQ Diff is calculated as the current year difference between a firm's RQ Rank and the average RQ Rank of all of a firm's interlocking firms. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

4.4. Cost and benefit test

While firms may improve their reporting quality in response to a high reporting quality signal that comes via a central firm, reporting quality itself has its own costs and benefits. In this section, I examine whether these firms that improve their reporting quality also experience the benefits and incur the costs associated with higher reporting quality. Accordingly, such a test would provide external evidence that these firms are indeed improving their reporting quality.

Prior literature has documented that one of the benefits of higher reporting quality is lower betas. Specifically, higher reporting quality directly affects the information quality available to investors (Lambert et al., 2007), which in turn lowers a firm's risk premium as manifested through lowered betas (Ashbaugh-Skaife et al., 2009). Moreover, prior literature has also shown that an important cost to improved reporting quality is audit fees. Higher audit fees reflect more effort by the auditor, and generally proxy higher quality of the auditor (Palmrose, 1986). Thus, one way to improve reporting quality is to increase the quality of audit, which would result in higher audit fees. To that end, as firms improve their reporting quality, they should be perceived to be less risky (lower betas).

To measure Beta, I regress a firm's monthly returns less the risk free rate on the market return less the risk free rate for the past 60 months and define as Beta as the coefficient on the market return. Audit Fees is the annual amount paid for the audit scaled by total assets. Beta and Audit Fees are each measured in year t + 1. Model (1) is rerun but once with Beta, and once with Audit Fees as the dependent variable. Table 5 reveals that results. In column 1, interaction of CF Interlock and High RQ Interlock is negative and statistically significant at the 5% level, while in column 2, the interaction is positive and significant at the 1% level. Altogether then, the firms that improve their reporting quality due to reporting signals emanating from their network also experience the costs and benefits associated with improved reporting. This provides more evidence that these firms indeed improve their reporting quality in response to their network's high reporting quality signal. It also suggests that for these firms, the incremental benefit of higher reporting quality outweighs the incremental cost (high audit fees) of higher reporting quality.

4.5. Alternate explanations

4.5.1. Director types

In this section, I examine whether the position of the director forming the interlock has an incremental impact on the contagion of high reporting quality. Directors with positions of authority could be more impactful in helping the spread of high reporting quality. Thus, I focus on four director categories: audit committee, audit committee chair, CEO, and board chair. To get a sense of the incremental impact on information transmission, I recalculate all the interlock variables

Table 5
Cost and benefits of high reporting quality.

Variables	$Beta_{t+1}$	$Audit\ Fees_{t+1}$
CF Interlock * High RQ Interlock	−0.051**	0.328***
	(−2.302)	(6.273)
CF Interlock	−0.018	−0.133***
	(−1.130)	(−3.690)
High RQ Interlock	0.046**	−0.193***
	(2.376)	(−4.085)
Low RQ Interlock	0.037***	0.010
	(3.427)	(0.444)
Log Assets	0.004	−0.525***
	(1.039)	(−35.000)
MktToBook	0.010***	0.040***
	(5.191)	(6.644)
CFO	−1.141***	−2.186***
	(−16.755)	(−8.861)
Leverage	0.035	−1.316***
	(1.096)	(−17.275)
Board Size	−0.135***	−0.104*
	(−8.186)	(−1.809)
Percent Outsiders	0.014	0.281***
	(0.457)	(3.158)
Total Board Link	−0.014	0.027
	(−1.532)	(1.171)
High RQ	−0.029***	−0.012
	(−2.656)	(−0.472)
Industry and year fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant	0.864***	4.843***
	(12.714)	(23.184)
Observations	18,973	18,095
R-squared	0.262	0.303

This table presents results of Model (1), but with alternate dependent variables. Beta is the dependent variable in column 1 and Audit Fees is the dependent variable in column 2. Beta is the coefficient that results when a firm's monthly returns less the risk free rate is regressed on the market return less the risk free rate for the past 60 months. Audit Fees are total audit fees scaled by assets. Beta and Audit Fees are calculated in year t + 1. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

twice, once for directors in the category and once for directors outside the specified category.

All the interlock variables are recoded to 1 if they meet the original criteria and the linking director is on the focal firm's audit committee. High RQ Interlock (Low RQ Interlock) is coded 1 if the focal firm shares a director with a High (Low) RQ firm via an audit committee member and 0 otherwise. CF Interlock is redefined to be 1 if the focal firm shares a director with a High RQ firm via an audit committee member and 0 otherwise. Similarly, these three interlock variables are then measured for non-audit committee members. For instance, High RQ Interlock is coded 1 if the focal firm shares a director with a High (Low) RQ firm via director who is not an audit committee member and 0 otherwise. Low RQ Interlock and CF Interlock follow a similar pattern.

Likewise, two sets of interlock variables are created: one for interlocks formed by audit committee chairs of the focal firm and one for interlocks formed by non-audit committee chairs. Following a parallel logic, two sets of interlock variables based on whether the linking director is the focal firm CEO or whether the linking director is the focal firm's chairman, respectively.

For each category, Model (1) is run twice, once for interlocks formed by the defining director trait, and once for interlocks formed by directors without the defining trait. For brevity, Table 6 presents only some these models, since many of these iterations have similar results. Column 1 shows the model where all the interlocks are formed by audit committee members. In that model, the interaction of CF Interlock and High RQ Interlock is negative but statistically insignificant. A similar result is found in column 2, when all the interlocks are formed by non-audit committee members. In fact, in the unreported results, this interaction is statistically insignificant when the interlocks are formed by an audit committee chair member, a non-audit committee chairman, board chairman or a non-board chairman, respectively.

Similarly, as shown in column 3, interlocks formed by CEOs also had no effect on focal firm reporting. The only situation where director type had an incremental effect is in the case of non-CEO interlocks. As shown in column 4, the interaction is negatively significant at the 1% level. This is consistent with the notion that CEOs have a diverse set of responsibilities and improving reporting quality may fall outside the CEO's top priorities. However, the other directors are charged with monitoring the firm, so they would take a more active role in trying to improve reporting quality. Altogether, though, this suggests that the contagion of high reporting quality that is received via a central firm does not generally depend on the linking director's position. Stated differently, it appears that all directors have similar levels of influence when it comes to improving quality.

This also suggests that the main influence on high reporting quality is the status of the central firm, not the linking director. Accordingly, this provides more evidence that central firms are aiding the transmission of high reporting quality. To that end, this suggests that the focal firm pays more attention the status of the sending firm, rather than the status of the linking director.

4.5.2. Other networks

While the main result is that the board room network can transmit high reporting quality, other inter-firm networks exist that could also potentially impact firm reporting. To address this possibility, I rerun Model (1) but include variables that capture links to high and low reporting quality firms through industry and auditor. Accordingly, High RQ Industry Link is coded 1 if the focal firm shares an industry (SIC two-digit) with a High RQ firm and 0 otherwise. Low RQ Industry Link is coded 1 if the focal firm shares an industry with a Low RQ firm and 0 otherwise. Similarly, two auditor variables are created for links between a focal firm to a High RQ and Low RQ firm, respectively.

If high reporting quality travels through industry or auditor inter-firm networks, then links to High RQ firms through those channels should impact the focal firm's reporting. Table 7 reports the results.

Table 6
High reporting quality contagion by director types.

Dependent variable: RQ_{t+1}				
Variables	Audit comm. member	Non-audit comm. member	CEO	CEO
CF Interlock * High RQ Interlock	−0.002	−0.000	0.000	−0.005***
	(−0.728)	(−0.108)	(0.031)	(−2.593)
CF Interlock	0.000	0.001	0.001	0.002*
	(0.074)	(0.982)	(0.480)	(1.822)
High RQ Interlock	0.000	0.001	−0.002	0.004***
	(0.265)	(0.989)	(−0.988)	(2.864)
Low RQ Interlock	−0.001	0.003**	0.001	0.001
	(−0.521)	(2.345)	(1.060)	(1.226)
Controls included	Yes	Yes	Yes	Yes
Industry and year fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Constant	0.088***	0.104***	0.105***	0.102***
	(7.717)	(9.510)	(9.490)	(9.408)
Observations	15,644	15,644	18,018	18,018
R-squared	0.102	0.102	0.103	0.102

This table presents results of Model (1) but with alternate definitions of an interlock. RQ is the absolute value of abnormal accruals calculated as described in the text. High RQ Interlock is coded 1 if a firm is interlocked through an audit committee member of the focal firm to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through an audit committee member of the focal firm to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through an audit committee member of the focal firm and 0 otherwise. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Table 7
Controlling for other inter-firm networks.

Variables	RQ_{t+1}
CF Interlock * High RQ Interlock	−0.008***
	(−3.862)
CF Interlock	0.004***
	(3.219)
High RQ Interlock	0.006***
	(3.423)
Low RQ Interlock	0.002*
	(1.909)
High RQ Industry Link	−0.001
	(−1.051)
Low RQ Industry Link	0.008***
	(8.597)
High RQ Audit Link	0.000
	(0.058)
Low RQ Audit Link	0.002
	(0.340)
Controls included	Yes
Industry and year fixed effects	Yes
Year fixed effects	Yes
Constant	0.095***
	(7.969)
Observations	18,017
R-squared	0.107

This table presents results of Model (1) with additional controls for other inter-firm links. RQ is the absolute value of abnormal accruals calculated as described in the text. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. High RQ Industry Link is coded 1 if the firm shares an industry (SIC two digit) with a High RQ firm and 0 otherwise. Low RQ Industry Link is coded 1 if the firm shares an industry (SIC two digit) with a Low RQ firm and 0 otherwise. High RQ Auditor Link is coded 1 if the firm shares an auditor with a High RQ firm and 0 otherwise. Low RQ Auditor Link is coded 1 if the firm shares an auditor with a Low RQ firm and 0 otherwise All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

Specifically, the interaction between CF Interlock and High RQ Interlock remains negative and statistically significant. However, both High RQ Industry Link and High RQ Auditor Link have statistically insignificant coefficients. This suggests that even after controlling or other inter-firm networks, the effect of the board room network to transmit high reporting quality still persists.

4.5.3. Selection

While the results indicate that central firms positively impact the reporting of firms in their network, it could be the case that focal firms choose to interlock with central firms because they know that central firms can provide credible signals about high reporting quality. I control for potential self-selection in two ways. First, I run Model (1) only on the subset of sample firms that did not have any board turnover in the past year. Thus, a focal firm's interlocks are held constant. In Table 8 column 1, the interaction of CF Interlock and High RQ Interlock is negative and significant at the 10% level in this subsample. This suggests that the influence of central firms on focal firm reporting is prevalent even when the focal firm has no opportunity to pursue new interlocks.

The second way I control for self-selection is by focusing on the subset of firms that have an interlock with a central firm (CF Interlock = 1). For that subset, I examine whether the linking director was on the focal firm's board before joining the central firm. This way, the decision to interlock with a central firm is held constant. For a clean comparison, CF_Interlock_Before focuses on focal firms with only one central interlock. Thus, CF_Interlock_Before is set to 1 if a focal firm is interlocked with a central firm through, and that director was on the focal firm's board prior to joining the central firm and the focal firm only has one interlock with a central firm. CF_Interlock_Before is coded 0 for firms that are interlocked with a central firm but do not meet the stated conditions.

Thus, this test focuses on firms with an interlock with a central firm and examines the timing of that interlock matters in the spread of high reporting quality. If focal firms that are selecting directors based on their affiliations with central firms, then CF Interlock_Before should have statistical significance when regressed on RQ. However, in column 2 of Table 8, the interaction of CF Interlock_Before and High RQ Interlock is statistically insignificant, suggesting that the impact of the central firm on focal firm reporting is not contingent on the director's selection process. Altogether, these tests provide evidence that the main results are not driven by focal firms selecting to be interlocked with central firms.

4.6. Size as measure of status

Even though firm centrality is well-regarded to be associated with status, firm size is also known to enhance status (Erkens & Bonner, 2013). Larger firms naturally have more contacts which increases their potential sphere of influence. Thus, large firms have the potential to spread high reporting quality within the boardroom network. To control for this possibility, I quintile rank the sample based on total assets and code Large Firm Interlock equal to 1 if a focal firm is interlocked with a firm in the top size quintile and 0 otherwise. I rerun Model (1) with Large Firm Interlock and its interaction with High RQ Interlock

Table 8
Self selection tests.

Dependent variable: RQ_{t+1}		
Variables	No board change in prior year	Director on focal firm board first
CF Interlock * High RQ Interlock	−0.007*	
	(−1.906)	
CF Interlock	0.001	
	(0.438)	
CF Interlock Before * High RQ Interlock		−0.007**
		(−2.058)
CF Interlock Before		−0.000
		(−0.046)
High RQ Interlock	0.007**	−0.001
	(2.369)	(−0.602)
Low RQ Interlock	0.003*	0.002*
	(1.763)	(1.652)
Controls included	Yes	Yes
Industry and year fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant	0.093***	0.112***
	(7.556)	(7.100)
Observations	6,376	10,366
R-squared	0.099	0.121

This table presents results of Model (1) but with modified samples. In column 1, the sample is restricted to firms that did not experience any turnover in their audit committee in the prior year. In column 2, the sample is restricted to firms that are interlocked to a central firm through an audit committee member (CF Interlock = 1). RQ is the absolute value of abnormal accruals calculated as described in the text. High RQ Interlock is coded 1 if a firm is interlocked through an audit committee member to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlocks is coded 1 if a firm is interlocked through an audit committee member to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm via an audit committee member and 0 otherwise. CF Interlock Before is set to 1 if the firm is interlocked with central firm via an audit committee member, that director was on the firm's board before joining the focal firm and the firm is only interlocked with one central firm during the year and 0 otherwise All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Table 9
Effect of Large Firm Interlocks.

Variables	RQ_{t+1}	RQ_{t+1}
Large Firm Interlock * High RQ Interlock	−0.001	0.002
	(−0.537)	(0.890)
Large Firm Interlock	0.000	−0.001
	(0.307)	(−0.646)
CF Interlock * High RQ Interlock		−0.008***
		(−3.864)
CF Interlock		0.005***
		(3.187)
High RQ Interlock	0.001	0.006***
	(0.874)	(3.138)
Low RQ Interlock	0.002**	0.002**
	(2.082)	(2.150)
Log Assets	−0.006***	−0.006***
	(−12.733)	(−12.584)
MktToBook	0.001***	0.001***
	(6.072)	(6.077)
CFO	0.016**	0.016**
	(2.273)	(2.272)
Leverage	−0.006*	−0.006*
	(−1.827)	(−1.937)
Board Size	0.000	0.000
	(0.193)	(0.045)
Percent Outsiders	0.001	0.001
	(0.205)	(0.266)
Total Board Link	0.000	−0.000
	(0.306)	(−0.509)
High RQ	−0.008***	−0.008***
	(−9.298)	(−9.249)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant	0.103***	0.102***
	(9.409)	(9.349)
Observations	18,017	18,017
R-squared	0.102	0.103

This table presents results of Model (1) but includes an additional control for Large Firm Interlock, which is coded 1 if the firm is interlocked with a Large Firm and 0 otherwise. Large Firms are those firms in the top quintile of total assets. RQ is the absolute value of abnormal accruals calculated as described in the text. High RQ Interlock is coded 1 if a firm is interlocked through any director to a High RQ firm and 0 otherwise. High RQ is defined as a firm in the lowest quintile of RQ. Low RQ Interlock is coded 1 if a firm is interlocked through any director to a Low RQ firm and 0 otherwise. Low RQ is defined as a firm in the highest quintile of RQ. CF Interlock is set to 1 if the firm is interlocked with central firm through any director and 0 otherwise. All other variables are defined in Appendix A. Industry and year fixed effects are included. Standard errors are clustered by firm. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

as the only independent variables and present the results in Table 9. The interaction of Large Firm Interlock and High RQ Interlock is statistically insignificant. Moreover, as shown in column 2, when CF Interlock is added to the regression, its interaction with High RQ Interlock retains its negative and significant coefficient while the Large Firm Interlock interaction term is still insignificant. This suggests that central firms are in a unique position to spread reporting practices. That is, the combination of status and network position enables central firms to influence the spread of high reporting quality.

5. Conclusion

This paper examines whether high reporting quality is contagious in a similar manner as aggressive reporting is within the corporate network. I find that sharing a director with a high reporting quality firm does not impact a firm's future reporting. This is consistent with the notion that positive practices are not as contagious as negative ones, and points to an asymmetry with which reporting practices spread through the corporate network. However, high reporting quality does spread within the network but only when the firm is also interlocked with a central firm. Thus, the status of the central firms allows them to endorse high reporting, which enables such reporting to spread.

The results further document that firms with ex-ante conditions for poor reporting are the most receptive the high reporting quality coming from the central firms. This indicates that susceptible to poor reporting practices stand to benefit most from such from this signal. Altogether, the results highlight that high reporting quality can be contagious, but through central firms. Thus, these central firms are in a position to initiate positive reporting contagion through their network.

Appendix A. Variable definitions

Variables	Definition
Degree	$\Sigma_j x_{ij}/(n-1)$ Where xij is the number of links a firm has and n is number of firms in the network
Close	$\frac{n-1}{\Sigma_{j\neq i} C(i,j)}$ Where C(i,j) is the shortest path between firm i and firm j and n is the number of firms in the network
Between	$\frac{\Sigma_{j\neq i, i\notin\{k,j\}} \frac{P_i(kj)}{P(kj)}}{(n-1)(n-2)/2}$ Where Pi(kj) are the number of shortest paths between firm k and firm j that firm i lies on and P(kj) are the total shortest paths between firm k and firm j.
Eigenvector centrality	$(1/\lambda)(\Sigma j\, Ai,j * evj)$, where λ, is a parameter needed for a non-trivial solution, A is the adjacency matrix and evj is the eigenvector centrality of firm j.
Central firm	The social network measures are ranked into quintiles for each year then the quintile ranking for each firm-year is averaged. Central firm is coded 1 for firm years in the top quintile of the summed rankings.
Focal firm	In the interlock analysis, the focal firm is the firm interlocked with the central firm.
High RQ Interlock	Coded 1 if a focal firm is interlocked with a High RQ firm and 0 otherwise. A High RQ firm is a firm that is ranked in the lowest quintile of reporting quality, RQ.
Low RQ Interlock	Coded 1 if a focal firm is interlocked with a Low RQ firm and 0 otherwise. A Low RQ firm is a firm that is ranked in the top quintile of reporting quality, RQ.
CF Interlock	Coded 1 if a focal firm is interlocked with a central and 0 otherwise.
RQ	The residual for each firm that comes from the following regression based on industry (SIC 2 digit) and year: $Accruals_{i,t} = \beta_0 + \beta_1 (Revenue_{,t} - {}_{\Delta}AR_{i,t}) + \beta_2 PPE_{i,t} + \beta_3 ROA_{i,t} + \varepsilon.$ Accruals is income before extraordinary items less operating cash-flow. PPE is property plant and equipment. AR is accounts receivable and ROA is earnings before extraordinary items scaled by total assets. All variables are scaled by total assets.
Log Assets	Log of total assets
MktToBook	Market value divided by book value
CFO	Cash flow from operations scaled by total assets
Leverage	Short term debt plus long term debt divided by market value of equity
Board Size	Log of the number of board size
Percent Outsiders	Log of total of outside directors on the board
Total Board Links	Total number of interlocks a firm has with other firms through all of their directors.
Growth	Percentage change in sales from year t − 1 to year t.
AC Experience	The average number of board seats per audit committee member
F Score	The scaled predicted probability from plugging time variant firm characteristics into the following model, which uses estimated coefficients from Dechow et al. (2011): $Manipulation_t = -8.252 + (.665) * RSST\ Accruals_t + (2.457) * \Delta AR_t + (1.393) * \Delta Inventory_t + (2.011) * Soft\ Assets_t + (.159) * \Delta Cash_t + (-1.029) * \Delta ROA_t + (.983) * Actual\ Issue_t + (-.150) * \Delta Abnormal\ Employee_t + (.419) * Lease_t$ RSST Accruals are the change in non-cash net operating assets; change in receivables is Accounts Receivables scaled by total assets; change in inventory is Inventory scaled by total assets; Soft Assets is total assets less cash and property plant and equipment scaled by total assets; change in cash sales is percentage change in cash sales less accounts receivables; ROA is earnings before extraordinary items scaled by total assets; actual issuance is an indicator variable which is one if the firm has issued new debt or equity during the time period; abnormal change in employees is percentage change in the number of employees less percentage change in assets; lease is an indicator variable coded 1 if future operating lease obligations are greater than zero. F Score is the predicted probability from the above model, scaled by the unconditional probability of having accounting manipulations.

References

Ashbaugh-Skaife, H., Collins, D. W., Kinney, W. R., Jr., & LaFond, R. (2009). The effect of SOX internal control deficiencies on firm risk and cost of equity. *Journal of Accounting Research*, *47*(1), 1–42.

Balch, D., & Armstrong, R. (2010). Ethical marginality: The Icarus syndrome and banality of wrongdoing. *Journal of Business Ethics*, *92*, 291–303.

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice Hall.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than Good. *Review of General Psychology*, *5*, 323–370.

Bell, G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal*, *26*(3), 287–295 (March 1).

Bizjak, J., Lemmon, M., & Whitby, R. (2009). Option backdating and board interlocks. *Review of Financial Studies*, *22*(11), 4821–4847 (November 1).

Borgoatti, S., Everett, M., & Freeman, L. (2002). *UCINET 6 for Windows: Software for social network analysis.* Harvard, MA: Analytic Technologies.

Bouwman, C. S. (2011). Corporate Governance Propagation through Overlapping Directors. *The Review of Financial Studies*, *24*(7), 2358–2394.

Brown, J. (2011). The spread of aggressive corporate tax reporting: A detailed examination of the corporate-owned life insurance shelter. *The Accounting Review*, *86*(1), 23–57.

Bruynseels, L., & Cardinaels, E. (2013). The audit committee: Management watchdog or personal friend of the CEO? *The Accounting Review*, *89*(1), 113–145.

Chiu, P., Teoh, S., & Tian, F. (2013). Board interlocks and earnings management contagion. *The Accounting Review*, *88*(3), 915–944.

Davis, G. F. (1991). Agents without principles? The Spread of the poison pill through the intercorporate network. *Administrative Science Quarterly*, *36*(4), 583–613 (Dec., 1991).

Davis, G. F., & Greve, H. R. (1997). Corporate elite networks and governance changes in the 1980s. *American Journal of Sociology*, *103*(1), 1–37 (July 1).

Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. R. G. (2011). Predicting material accounting misstatements. *Contemporary Accounting Research*, *28*(1), 17–82.

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *Accounting Review*, *70*(2), 193–225.

Dechow, P. M., & Dichev, I. (2002). The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review*, *77*, 35–59 Supplement: Quality of Earnings Conference (2002).

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001

Erkens, D. H., & Bonner, S. E. (2013). The role of firm status in appointments of accounting financial experts to audit committees. *The Accounting Review*, *88*(1), 107–136.
Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of Accounting and Economics*, *39*(2), 295–327.
Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review*, *79*(4), 967–1010.
Gino, F., Gu, J., & Zhong, C. B. (2009). Contagion or restitution? When bad apples can motivate ethical behavior. *Journal of Experimental Social Psychology*, *45*(6), 1299–1302.
Goh, B. W. (2009). Audit committees, boards of directors, and remediation of material weaknesses in internal control. *Contemporary Accounting Research*, *26*(2), 549–579.
Greve, H. R. (2005). Interorganizational learning and heterogeneous social structure. *Organization Studies*, *26*(7), 1026–1047.
Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting Horizons*, *13*(4), 365–383.
Ito, T. A., Larsen, J. T., Smith, N. K., & Cacioppo, J. T. (1998). Negative information weighs more heavily on the brain: The negativity bias in evaluative categorizations. *Journal of Personality and Social Psychology*, *75*(4), 887.
Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. Econometrica. *Journal of the Econometric Society*, *47*(2), 263–291.
Kellermann, K. (1984). The negativity effect and its implications for initial interaction. *Communication Monographs*, *51*(1), 37–55.
Klein, A. (2002). Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics*, *33*(3), 375–400.
Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. *Journal of Accounting and Economics*, *39*(1), 163–197.
Lambert, R., Leuz, C., & Verrecchia, R. E. (2007). Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research*, *45*(2), 385–420.
Larcker, D., So, E., & Wang, C. (2013). Boardroom centrality and firm performance. *Journal of Accounting and Economics*, *55*(2013), 225–250.
Lieberman, A., & Asaba, S. (2006). Why do firms imitate each other? *Academy of Management Review*, *31*(2), 366–385 (2006).
Mizruchi, M. (1996). What do interlocks do? An analysis, critique, and assessment of research on interlocking directorates. *Annual Review of Sociology*, *22*, 271–298.
Palmer, D., Jennings, P. D., & Zhou, X. (1993). Late adoption of the multidivisional form by large U.S. corporations: Institutional, political, and economic accounts. *Administrative Science Quarterly*, *38*(1), 100–131.
Palmrose, Z. V. (1986). Audit fees and auditor size: Further evidence. *Journal of Accounting Research*, *24*(1), 97–110.
Podolny, J. M. (1994). Market uncertainty and the social character of economic exchange. *Administrative Science Quarterly*, *39*(3), 458–483.
Rao, H., Davis, G., & Ward, A. (2000). Embeddedness, social identity and mobility: Why firms leave the NASDAQ and join the New York Stock Exchange. *Administrative Science Quarterly*, *45*(2), 268–292.
Reppenhagen (2010). Contagion of accounting methods: Evidence from stock option expensing. *Review of Account Studies*, *15*(3), 629–657.
Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York: Free Press.
Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, *5*(4), 296–320.
Skinner, D., & Sloan, R. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies*, *7*(2–3), 289–312.
Vafeas, N. (2005). Audit committees, boards, and the quality of reported earnings. *Contemporary Accounting Research*, *22*(4), 1093–1122.

Please cite this article as: Felix, R., Examining the spread of high quality reporting through the corporate network, *Advances in Accounting, incorporating Advances in International Accounting* (2016), http://dx.doi.org/10.1016/j.adiac.2016.01.001